

CLAIMS

What is claimed is:

1. A transgenic plant, an essentially derived variety thereof, a plant part, or plant cell which comprises a nucleotide sequence for an SH2A or SH2A-like gene wherein said nucleotide sequence is heterologous to the genome of said transgenic plant, essentially derived variety thereof, plant part or plant cell.
2. A transgenic plant, an essentially derived variety thereof, a plant part, or plant cell which comprises a nucleotide sequence for an SH2A or SH2A-like gene wherein said nucleotide sequence has been introduced into the transgenic plant, plant part or plant cell by recombinant DNA means.
3. A transgenic plant, an essentially derived variety thereof, a plant part, or plant cell which comprises an SH2A or SH2A-like protein wherein said SH2A or SH2A-like protein is heterologous to the transgenic plant, essentially derived variety thereof, plant part or plant cell.
4. A plant cell or protoplast transformed with a nucleotide sequence for an SH2A or SH2A-like gene wherein said nucleotide sequence is heterologous to the genome of the plant cell or plant protoplast.
5. The plant cell or protoplast of claim 4 wherein the plant cell is stably or transiently transformed.
6. A host cell which comprises a nucleotide sequence for an SH2A or SH2A-like gene wherein said nucleotide sequence is heterologous to the genome of said host cell or wherein said nucleotide sequence has been introduced into said host cell by recombinant DNA means.
7. A host cell according to claim 6 wherein said host cell is a bacterial, yeast, fungal, insect, plant, animal or human cell.

8. A host cell according to claim 6 wherein the nucleotide sequence for an SH2A or SH2A-like gene is in the sense or antisense orientation relative to a regulatory region directing expression of said nucleotide sequence or wherein said nucleotide sequence is included in a gene silencing construct driven by a regulatory region.

9. A method for modulating growth or survival of cultured cells under hypoxic conditions which comprises modulating the level and/or activity of an SH2A or SH2A-like protein in said cultured cells.

10. A method for altering growth response in cultured cells which comprises modulating the level and/or activity of an SH2A or SH2A-like protein in said cultured cells.

11. The method of claim 9 or 10 wherein the cultured cells are bacterial, yeast or fungal cells.

12. The method of claim 9 or 10 wherein the cultured cells are animal, human or insect cells.

13. The method of claim 9 or 10 wherein the cultured cells are plant cells.

14. A method for altering growth response in cells, tissues or organs of an organism which comprises modulating the level and/or activity of an SH2A or SH2A-like protein in said cells, tissues or organs of said organism.

15. A method for altering growth response in cells, tissues or organs of a plant which comprises modulating the level and/or activity of an SH2A or SH2A-like protein in said cells, tissues or organs of said plant.

16. The method according to claim 15 wherein the level of SH2A or SH2A-like protein is modulated by increasing transcription of a nucleotide sequence for said SH2A or SH2A-like protein.

17. The method according to claim 16 wherein the increase in transcription is induced by exposing the cells, tissues or organs of a plant to ethephon or ethylene.

18. A method for producing a plant which is adapted to growth in hypoxic conditions which comprises transforming at least one of a plant cell, pollen, protoplast, explant, plant part or plant organ with a coding sequence for an SH2A or like gene and regenerating a plant therefrom.

19. A method for improving survival of a plant in conditions of low oxygen which comprises transforming at least one of a plant cell, pollen, protoplast, explant, plant part or plant organ with a coding sequence for an SH2A or SH2A-like gene and regenerating a plant therefrom.

20. A method for improving water logging tolerance in a plant which comprises transforming at least one of a plant cell, pollen, protoplast, explant, plant part or plant organ with a coding sequence for an SH2A or SH2A-like gene and regenerating a plant therefrom.

21. A method for inducing gibberellin biosynthesis in a plant cell, protoplast, explant, plant part or plant organ, said method comprising modulating the level and/or activity of SH2A or SH2A-like protein therein.

22. A method for inducing gibberellin biosynthesis in a plant, said method comprising modulating the level and/or activity of SH2A or SH2A-like protein in the cells or a group of cells of said plant.

23. A method of regulating an anaerobic response protein in a plant cell, protoplast, explant, plant part or plant organ which comprises modulating the level and/or activity of an SH2A or SH2A-like protein therein.

24. The method of claim 23 wherein the anaerobic response protein is pyruvate decarboxylase 2.

25. A genetic construct comprising a nucleotide sequence for an SH2A or SH2A-like gene operably linked to a promoter sequence which directs expression of said nucleotide sequence.

26. The genetic construct of claim 25 wherein the SH2A or SH2A-like gene is a cDNA or genomic sequence.

27. The genetic construct of claim 25 wherein the SH2A or SH2A-like gene is a synthetic sequence.

28. The genetic construct of any one of claims 25-27 wherein the nucleotide sequence for an SH2A or SH2A-like gene is in a sense or antisense orientation relative to the promoter sequence or is included in a gene silencing construct.

29. A chimeric gene construct comprising a gene coding for an SH2A or SH2A-like protein wherein said gene is under the control of a promoter which functions in plants.

30. A chimeric gene construct comprising an SH2A or SH2A-like gene promoter operably linked to a heterologous coding sequence.

31. An isolated nucleic acid coding for an SH2A-like protein selected from the group consisting of nucleic acid sequences set forth in SEQ ID NOs:5, 7, 9, 11, 13, 15, and 17.

32. An isolated SH2A-like protein having an amino acid sequence selected from the group consisting of amino acid sequences set forth in SEQ ID NO:6, 8, 10, 12, 14, 16 and 18.

33. Pollen from the transgenic plant or essentially derived variety thereof of any one of claims 1-3.

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